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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/537,894	06/07/2005	Michael S. Griffith	540-565	8424
23117	7590	10/27/2006	EXAMINER	
NIXON & VANDERHYE, PC 901 NORTH GLEBE ROAD, 11TH FLOOR ARLINGTON, VA 22203			JONES, JAMES	
			ART UNIT	PAPER NUMBER
			2891	

DATE MAILED: 10/27/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

<p align="center">Office Action Summary</p>	Application No. 10/537,894	Applicant(s) GRIFFITH ET AL.	
	Examiner James C. Jones	Art Unit 2891	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 07 June 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-16 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-16 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 06 July 2005 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date <u>06/07/2005</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Drawings

1. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they do not include the following reference sign(s) mentioned in the description: **[39]**. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.
2. In addition to Replacement Sheets containing the corrected drawing figure(s), applicant is required to submit a marked-up copy of each Replacement Sheet including annotations indicating the changes made to the previous version. The marked-up copy must be clearly labeled as "Annotated Sheets" and must be presented in the amendment or remarks

section that explains the change(s) to the drawings. See 37 CFR

1.121(d)(1). Failure to timely submit the proposed drawing and marked-up copy will result in the abandonment of the application.

Claim Objections

3. **Claims 6-16** are objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. Claim 6, sets forth a deformable mount and deformable mirror as in claim 1, however claim 1 only sets forth a deformable mirror. Claim 7, sets forth a deformable mirror holder and deformable mirror as in claim 1, however claim 1 only sets forth a deformable mirror.

Claim Analysis

4. The claimed deformable mirror mount and deformable mirror holder are viewed as equivalent to one another and will be examined as such.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. **Claim 1** is rejected under 35 U.S.C. 102(b) as being anticipated by Aldrich et al. USP 4674848 hereafter '848.

In regards to **claim 1** '848 teaches a deformable mirror comprising:

A reflective surface(reflective element) is formed

on the faceplate(substrate)(see column 2 lines 27-29) which is

secured to a base(deformable element)(see column 2 line 33);

At least one coolant carrying members(channels)(see column 2 lines 29-31 and 38-39)having apertures(ports) located around the periphery(see column 4 lines 8-9 and 54-58)of the substrate.

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and

the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. **Claims 1-8,13,15 and 16** rejected under 35 U.S.C. 103(a) as being unpatentable over Aldrich et al. USP 4674848 hereafter '848 in view of Engel et al USP 3923383 hereafter '383.

The cited primary reference substantially teaches

A reflective surface(reflective element) is formed

on the faceplate(substrate)(see column 2 lines 27-29) which is secured to a base(deformable element)(see column 2 line 33);

At least one coolant carrying members(channels)

(see column 2 lines 29-31 and 38-39)having apertures(ports) located around the periphery(see column 4 lines 8-9 and 54-58)of the substrate.

The cited primary reference does not teach the channels being interconnected by a chamber.

The added secondary reference teaches an improved deformable mirror wherein a plurality of vanes **[46]**(channels)(see column 2 lines 36-38) have ports **[36]** around the outer wall(see column 2 lines 48-49) wherein vanes interconnected by a central hub(chamber)(see figure 1).

This yields the benefit of improved uniform, effective and efficient cooling of the mirror surface.

It would have been obvious to one with ordinary skill in the art at the time the invention was made to have included a plurality of vanes interconnected by a chamber as taught in '383, in the apparatus set forth in '848, so coolant can flow through a plurality of vanes into a chamber for the benefit of improved uniform, effective, and efficient cooling of the mirror surface.

In regards to **claim 3** '383 teaches a plurality of vanes(channels) intersect to form a central hub(chamber)(see column 2 lines 30-31 and figure 1).

In regards to **claim 4** '383 teaches a plurality of vanes(channels) extend to intersect at the center(see figure 1).

In regards to **claim 5** '383 teaches vanes(channels) extend from the central hub toward the edge of the mirror(see column 2 lines 35-37) forming a circular central hub(chamber)(see figure 1).

In regards to **claim 6** '848 teaches a manifold which is an integral element of the mirror's supporting surface(column 2 lines 24-25), a pair of coolant carrying channels [45](channels)(see column 4 lines 13-14) that

terminate to face posts [54][40](plugs)(see figure 1 and 2), and connecting the mirror and mount via flexible tubing(flexible seals)(see column 4 lines 42-43)

In regards to **claim 7** '848 teaches flexible tubing where the center shape of the flexible tubing is O-shaped to surround the apertures(channels) of the mirror [14] and base [10] where they terminate to face each other(see column 4 lines 20-21 and figures 1 and 2).

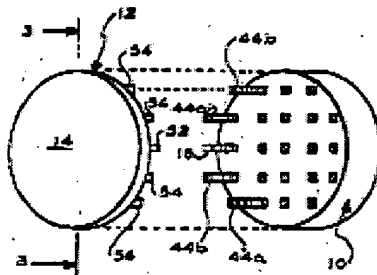


Figure 1

In regards to **claim 8** '848 teaches a plurality of posts around the periphery that terminate to form a plurality of apertures(ports) and a channel is provided in the base(mount) for each aperture. '848 also teaches channels terminating to face associated apertures(see column 4 lines 54-58 and figures 1 and 2).

9. **Claims 9-11 and 14** are rejected under 35 U.S.C. 103(a) as being unpatentable over Aldrich et al. USP 4674848 in view of Engel et al. USP

3923383 as applied to claim 6 above, and further in view of Bacich USP 4733945 hereafter '945.

The previous combination remains as applied above; However, the previous combination does not teach a plurality of flexible beams used as a supporting surface and a flexible portion that connects the beam's end to the mounts body.

The added '945 reference teaches an improved deformable mirror wherein the mirror is supported by plurality of cantilevered flexures (flexible beams) having one end shaped to provide a supporting surface(see column 4 line 13 and figures 2 and 4) and a flexure[22](flexible portion) that connects to the mounts body(see column 17 lines 9-14 and figures 2b and 4) which, is readable on the claimed feature of a plurality of flexible beams having one end shaped for a supporting surface and a flexible portion that connects to the mount's body. This yields the benefit of providing stability to the lens as its diameter increase and decreases do to changes in temperature(see column 5 lines 65-68 and column 6 lines 1-3).

It would have obvious to one of ordinary skill in the art at the time the invention was made to have included a flexible beam as taught in '945, in the apparatus set forth in the previous combination, to support the mirror,

for the benefit of providing stability to the lens as its diameter increase and decreases do to the various changes in temperatures. (see column 5 lines 65-68 and column 6 lines 1-3 and 63-66).

With respect to **claim 10** '945 teaches a L-shaped support beam(see figure 4) such that one leg of the L-shaped provides the flexure[52](flexible portion) and the lens seat[29] provides the supporting surface(see column 5 lines 4-5, column 6 lines 60-66 and figure 4).

With respect to **claim 11** '945 teaches the internal corner of the L-shaped support beam has a shoulder[25] that extends along both legs and supports the mirror from the side(see figures 2a, 2b and 4).

10. **Claim 12** is rejected under 35 U.S.C. 103(a) as being unpatentable over Aldrich et al. USP 4674848 in view of Engel et al. USP 3923383, also in further view of Bacich USP 4733945 as applied to claim 9 above, and further in view of Lafiandra USP 6048070 hereafter '070.

In regards to **claim 12** the previous combination remains as applied above; however, the previous combination does not teach the claimed termination of channels between pairs of flexible beams.

The added '070 reference teaches an improved deformable mirror wherein heat exchange ducts[26](channels) which terminate between the

back plate[14] and flexures[18](see figure 1), the back plate and flexures are formed from the same piece of material(column 2 lines 57-58). The ducts terminate between the flexible beam for the benefit of having fluid such as water flowing through them to transfer heat from the mirror.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have included exchange ducts terminating at a gap between a pair of flexible beams as taught in '070 in the apparatus set forth in the previous combination, to carry fluid from the mirror for the benefit of transferring heat from the mirror.

With respect to **claim 13** '848 teaches that channels are provided by posts[40][54](plugs) in the mounts body(see column 4 lines 8-9,54-56 and figure 2).

With respect to **claim 14** '945 teaches a flexible beam of L-shaped construction, which is equivalent to the claimed flexible beam that has L-shaped construction. Since the claimed flexible beam and the disclosed flexible beam are of the same shape it would be obvious to one of ordinary skill in the art that the disclosed flexible beam will be able to accommodate the plugs and O-rings that connect the plugs to the mirror's peripheral edge(see figure 4)

With respect to **claim 15** '848 teaches the apertures[42](channels) in the posts[40](plugs) communicate with other apertures[56] channels on the outer surface of the mounts body(see figure 2).

With respect to **claim 16** '848 teaches channels in alternate posts[54](plugs) of the faceplate and posts[40](plugs) of the base(mount), communicate with each other to carry coolant to and from coolant spaces[58](see column 5 lines 1-5, 20-24 and figure 2).

Conclusion

11. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Ikramov A.V. et al.: "Bimorph adaptive mirror", Soviet Journal of Quantum Electronics, American Institute of Physics, Woodbury, NY, US, Vol.22, no.2,1 February 1992, pages 163-168, Haws et al. USP 7069975, Peters et al. USP 3986768, and Merz et al. USP 6307688.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to James C. Jones whose telephone number is (571) 270-1278. The examiner can normally be reached on Monday thru Friday, 8 a.m. to 5 p.m. est. time.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Angela Ortiz can be reached on (571)272-1206. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

JCJ

Jones C. Jones 10/24/2006

Angela Ortiz
ANGELA ORTIZ
PRIMARY EXAMINER
SUPERVISOR

10/24/06